

- (b) For two lives (x) and (y) the joint *pdf* of their future life times, $T(x)$ and $T(y)$ is

$$f_{T(x) T(y)}(s,t) = \begin{cases} 0.0006(t-s)^2 & 0 < s < 10, 0 < t < 10 \\ 0 & \text{elsewhere.} \end{cases}$$

13. (a) Define Lexis diagram. What are the uses of Lexis diagram. Also, state the important features of Lexis diagram.

(OR)

- (b) Distinguish between stationary population and stable population.

Register Number :

Name of the Candidate :

2 1 9 0

P.G. DIPLOMA EXAMINATION, 2008

(ACTUARIAL STATISTICS)

(PAPER - III)

130. ADVANCED TOPICS IN ACTUARIAL STATISTICS

May]

[Time : 3 Hours

Maximum : 100 Marks

SECTION – A (5 × 8 = 40)

Answer any FIVE questions.

All questions carry equal marks.

1. What is meant by contract premium ?
2. Discuss the equivalence principle used in premium calculations.
3. Write a note on fully continuous benefit reserves.
4. What is retrospective formula in benefit reserves ?

Turn over

5. Distinguish discrete insurance and continuous insurance.
6. Define joint life status.
7. Express each of the following probabilities in terms of the single life probabilities nP_x and nP_y .
 - (i) Both lives will survive n years.
 - (ii) At least one life will survive n years.
 - (iii) Exactly one life will survive n years.
8. Write a note on population dynamics.

SECTION – B ($3 \times 20 = 60$)

Answer any THREE questions.

All questions carry equal marks.

9. (a) Derive an expression for the calculation of fully discrete premium.
(OR)
- (b) Calculate $\bar{P}(\bar{A}_x)$ and $\text{Var}(L)$ with the assumption that the force of mortality is a constant $\mu = 0.04$ and the force of interest $\sigma = 0.06$.

10. (a) Explain initial paid up insurance.
(OR)
- (b) What do you mean by retrospective formula? Derive the same.
11. (a) Explain in detail benefit reserves at fractional durations.
(OR)
- (b) A fully discrete whole life insurance with a unit benefit issued to (x) first year benefit premium equal to the actual present value of the first years benefit and the remaining benefit premiums are level and determined by the equivalence principle. Determine formulas for
 - (i) the first year benefit premium.
 - (ii) the level benefit premium after first year.
 - (iii) the benefit reserve at the first deviation.
12. (a) Obtain the distribution of the time-until failure of a joint life status.

(OR)

Turn over